OMB Control # 2060-0482

For EPA Use Only ID # _____

SECTOR _____

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

2003 Application for Critical Use Exemption of Methyl Bromide for Pre Plant Use in 2005 and beyond in the United States

WHY IS THIS INFORMATION NEEDED?	Under the Clean Air Act and the international treaty to protect the ozone layer (the Montreal Protocol on Substances that Deplete the Ozone Layer), the production and import of methyl bromide will be phased out in the United States on January 1, 2005. This application seeks information to support a U.S. request to produce and import methyl bromide for certain critical uses and circumstances beyond this 2005 phaseout date. The information in this application will be used to review whether your use of methyl bromide is "critical" because no technically and economically feasible alternatives are available. In order to estimate the loss as a result of not having methyl bromide available, EPA needs to compare data (yields, crops/crop groupings, prices, revenues and costs) for your use of methyl bromide with uses of alternative pest control regimens. If you submit a well documented application with sound reasons why alternatives are not technically and economically feasible, the U.S. government can be a better advocate for your exemption request internationally.

Click on the Instructions tab located at the bottom of the screen for additional information.

The information contained in this application is critical to process and assess the need for methyl bromide. Filling out this application in its entirety will bolster the U.S. government's ability to strengthen the nomination package for the international review boards.

INSTRUCTIONS

The information provided by you in this application will be used to evaluate the requested methyl bromide use. The U.S. and other countries that are parties to the Montreal Protocol On Substances That Deplete The Ozone Layer decided that: "a use of methyl bromide should qualify as "critical" only if the nominating Party determines that:

(i) The specific use is critical because the lack of availability of methyl bromide for that use would result in a significant market disruption; and
(ii) There are no technically and economically feasible alternatives available to the user that are acceptable from the standpoint of environment and health and are suitable to the crops and circumstances of the nomination …"

WHO APPLIES?	If you anticipate that you will need methyl bromide in 2005 because you believe there are no technically and economically feasible alternatives, then you should apply for the critical use exemption. This application may be submitted either by a consortium representing multiple users or by individual users. We encourage users with similar circumstances of use to submit a single application (for example, any number of pre plant users with similar soil, pest, and climactic conditions can submit a single application.) If a consortium is applying for multiple methyl bromide users, the economic data should be for a representative or typical user within the consortium unless otherwise noted. If economic or technical factors (such as size of the farm) affecting the ability of this "representative user" to use alternatives are significantly different than other users in the consortium, more than one application should be submitted to reflect these differences. Please contact your local, state, regional or national commodity association and/or state representative agency to find out if they plan on submitting an application on behalf of your commodity group.
STATE CONTACTS	States that have agreed to participate in the exemption process are listed on EPA's website at www.epa.gov/ozone/mbr/cueqa.html
HOW DO I APPLY?	You may either complete an electronic (Microsoft Excel) or a printed version of the application. Please fill out each form or worksheet in the application as completely as possible. If you are completing the printed version and need extra space you may attach additional sheets as needed. Additional information may be available from your local state department of agriculture or at the sites listed below or by calling 1-800-296-1996.
IS MY INFORMATION CONFIDENTIAL?	The applicant may assert a business confidentiality claim covering part or all of the information in the application by placing on (or attaching to) the information, at the time it is submitted to EPA, a cover sheet, stamped or typed legend, or other suitable form of notice employing language such as trade secret, proprietary, or company confidential. Allegedly confidential portions of otherwise non-confidential documents should be clearly identified by the applicant, and may be submitted separately to facilitate identification and handling by EPA. If the applicant desires confidential treatment only until a certain date or until the occurrence of a certain event, the notice should so state. Information covered by a claim of confidentiality will be disclosed by EPA only to the extent, and by means of the procedures set forth under 40 CFR Part 2 Subpart B; 41 FR 36902, 43 FR 400000. 50 FR 51661. If no claim of confidentiality accompanies the information when it is received by EPA, it may be made available to the public by EPA without further Applicants submitting their application via e-mail assume responsibility for the confidentiality of the electronic message transmission.
WHEN IS THE INFORMATION NEEDED?	This application must be postmarked to the EPA address below no later than 120 days after the Notice was published in the Federal Register requesting critical use exemption applications.
WHERE DO I SUBMIT THE APPLICATION?	**Electronic Address for applications:** methyl.bromide@epa.gov **(When submitting an application electronically, you should also print a hard copy, sign it, and submit it by mail)**

Mailing Address for applications being submitted by mail directly to the EPA:	**Address for applications being sent by courier or non-U.S. Postal overnight express delivery to the EPA:**
US Environmental Protection Agency Methyl Bromide Critical Use Exemption Office of Pesticide Programs Mail Code 7503C 1200 Pennsylvania Ave, NW Washington, DC 20460	US Environmental Protection Agency Methyl Bromide Critical Use Exemption Office of Pesticide Programs 911 Bay, BEAD 1921 Jefferson Davis Highway Arlington, VA 22202 Telephone: (703) 308-8200

HOW CAN I RECEIVE ADDITIONAL INFORMATION?	**If you have general questions about this application call:** Stratospheric Ozone Hotline 1-800-296-1996

INSTRUCTIONS

SECTIONS OF WORKBOOK	**Each worksheet number corresponds to the tab number in the electronic version of the application. Instructions specific to each worksheet are provided at the top of each sheet. A header row is included on each worksheet to include an application ID number that EPA will assign.**
	Instructions
	Worksheet 1. Contact and Methyl Bromide Request Information
	Worksheet 2. Methyl Bromide
	Worksheet 2-A. Methyl Bromide - Pest and Crop Information
	Worksheet 2-B. Methyl Bromide - Historical Use for 1997 - 2002
	Worksheet 2-C. Methyl Bromide - Crop/Crop Grouping Yield & Gross Revenue for 2000 - 2002
	Worksheet 2-D(1&2). Methyl Bromide - Baseline - Operating Costs for 2002 (Annual or Perennial)
	Worksheet 3. Alternatives
	Worksheet 3-A. Alternatives - Technical Feasibility of Alternatives to Methyl Bromide
	Worksheet 3-B(1&2). Alternatives - Changes in Operating Costs (Annual or Perennial)
	Worksheet 4. Future Research Plans
	Worksheet 5. Application Summary
	Definitions
	Climate Zone Map
EXCEL USER TIPS	**Inserting a blank worksheet:**
	1. To add additional blank worksheets in the Excel file, go to the menu line at the top of the worksheet and select “Insert” then “worksheet”
	2. A tab with the name “Sheet 1” will appear at the bottom of the worksheet and will be highlighted in white. Take the cursor and double click the “new tab”
	3. By double clicking in the tab you can now rename the worksheet to the appropriate number letter designation (e.g., 3-A(1), 3-A(1)(a), etc.)
	4. To move a newly inserted worksheet, simply drag the worksheet with your mouse to the desired location.
	5. Once you add a new worksheet, Excel will automatically name each subsequently added worksheet as Sheet 2, Sheet 3, etc… Follow the instructions above to rename the new blank worksheets as appropriate.
	Copying and pasting an entire worksheet’s contents into a blank worksheet:
	1. Select the worksheet to be copied by clicking on the worksheet tab at the bottom of the screen. The tab will turn white in color when it has been selected.
	2. Select the top left corner of the worksheet (this is the space to the left of column A and above row 1. You will know that the entire worksheet has been selected because the row and column marks as well as the worksheet itself will
	3. Go to the menu line at the top of the worksheet and select “Edit” then “Copy”.
	4. Go to the blank worksheet where you want the copied information to be pasted.
	5. Again, select the top left corner of the worksheet (left of column A and above row 1) to select the entire worksheet.
	6. Go to the menu line at the top of the worksheet and select “Edit” then “Paste”
	7. Change the title row of the newly pasted worksheet from the old worksheet number to be consistent with the worksheet tab.
	Note: This is the only way you can copy a worksheet and not lose portions of the text instructions.
	Viewing worksheets
	Worksheets are best viewed in "Page Break Preview." To select the view of the worksheet, go to the menu bar and select "View" and then "Page Break Preview." Page break preview shows only the printable area of the worksheet, with the blue lines that surround the screen indicating the edges of each page.
	To increase or decrease the size of the page that is viewable on the screen, go to the menu bar and select “View” and then “Zoom”.
	Navigating between worksheets
	The set of four arrows on the bottom left of the screen will help you navigate between worksheets. This is necessary to access the remaining worksheet tabs in the workbook that are not viewable. The two arrows with vertical lines to either the left or right will take you to the first worksheet and to the last worksheet respectively in the workbook. The inner two arrows allow you move the worksheet tabs to the right or to the left incrementally.
	The two arrows on the bottom right of the screen allow you to move the worksheet that you are viewing to the right or to the left. This is useful if the viewable area of on the screen is smaller than the entire page that is in the worksheet.
	Printing worksheets
	If you would like to print all worksheets that are contained in this workbook, go to the menu bar at the top of the screen and select "File" and then "Print." Then in the section of the menu that appears called "Print what," select "Entire Workbook."

Worksheet 1. Contact and Methyl Bromide Request Information

The following information will be used to determine the amount of methyl bromide requested and the contact person for this request. It is important that we know whom to contact in case we need additional information during the review of the application.

Is this information Confidential Business Information? **Yes** [ ] **No** [X]
If yes, the applicant assumes responsibility for the secure transmission of electronic submissions.

Applicant Name Nursery Association

Primary Contact

Contact Name	James White	**Specialty**	(Check One)
Address	0000 Nowhere Drive	**Agronomic**	[X]
	Anyplace, OZ 11111	**Economic**	[ ]
Daytime Phone	666-666-6666	**Cell**	666-666-6666
E-mail Address	james@white.box	**Fax**	666-666-6666

Alternate Contact

Contact Name	John Doe	**Specialty**	
Address	0000 Nowhere Drive	**Agronomic**	[X]
	Anyplace, OZ 11111	**Economic**	[ ]
Daytime Phone	555-555-5555	**Cell**	555-555-5555
E-mail Address	john@doe.net	**Fax**	555-555-5555

I certify that all information contained in this document is factual to the best of my knowledge.

Signature _____ **Date** _____

Print Name _____ **Title** _____

Information in this application may be aggregated with information from other applications and used by the United States government to justify claims in the national nomination package that a particular use of methyl bromide be considered "critical" and authorized for an exemption beyond the 2005 phaseout. Use of aggregate data will be crucial to making compelling arguments in favor of critical use exemptions. **By signing below**, you agree now to assert any claim of confidentiality that would affect the disclosure by EPA of aggregate information based in part on information contained in this application.

Signature _____ **Date** _____

Print Name _____ **Title** _____

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information. Public reporting burden for this collection of information is estimated to average 324 hours per response and assumes a large portion of applications will be submitted by consortia on behalf of many individual users of methyl bromide. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a current OMB control number.

Worksheet 1. Contact and Methyl Bromide Request Information

1. Location (Enter the state, region, or county.)

California and Utah

2. Crop/Crop Grouping (Include all crops/crop groupings that benefit from an application of methyl bromide in a fumigation cycle. For a definition of fumigation cycle see Worksheet entitled "Definitions".)

Nursery grown conifer tree seedlings and transplants used for reforestation

3. Range of acres farmed by growers included in this application

(Insert number or percentage of users in each category)

0 - 25 acres	1	**100 - 200 acres**	3
25 - 50 acres		**200 - 400 acres**	3
50 - 100 acres	5	**over 400 acres**	

4. Climate Zone (Indicate the climate zone designation by reviewing the U.S. climate zone map located at the end of this workbook or online at http://www.usna.usda.gov/ Hardzone/ushzmap.html.)

(check all that apply)

Zones:	**1**	**2a**	**2b**	**3a**	**3b**	**4a**	**4b**	**5a**	**5b**	**6a** X	**6b** X
	7a	**7b**	**8a** X	**8b** X	**9a**	**9b**	**10a**	**10b**	**11**		

5. Soil Type & Organic Matter (Indicate the soil type and percent organic matter where methyl bromide would be applied.)

(check all that apply)

Soil Type:	**Light**		**Medium**	X	**Heavy**	
Organic Matter:	**0 to 2 %**		**2 to 5 %**	X	**over 5 %**	

6. Is this applicant eligible for Quarantine and Preshipment (QPS) uses of methyl bromide? **Yes** ☐ **No** X **Pounds** _____

7. Has this applicant previously applied for Critical Use Exemption of methyl bromide? **Yes** ☐ **No** X **CUE #** _____

8. What is the amount of methyl bromide being requested by this application ? (Do NOT include QPS amounts)

If a consortium is submitting this application, the data should be the total for the consortium.

Year	Total Pounds Active Ingredient (a.i.) of Methyl Bromide		Total Area to be Treated	
2005	25,000	**lbs.**	100	**Acres**
2006	25,000	**lbs.**	100	**Acres**
2007	25,000	**lbs.**	100	**Acres**

9. Please explain why there may be variations in the pounds or acres treated from year to year.

The industry has replaced methyl bromide in all areas that are efficacious. The critical need for methyl bromide accounts for only 25% of the total industry acreage. Therefore, we have reduced our methyl bromide compsumption by 70% but need time to transition to other alternatives.

10. Please explain why methyl bromide is being requested.

11. Do you have access to recycled methyl bromide? **Yes** ☐ **No** X _____ **Lbs** If yes, please specify amount (in pounds).

12. Do you anticipate that you will have any methyl bromide in storage after January 1, 2005? **Yes** ☐ **No** X _____ **Lbs** If yes, please specify amount (in pounds).

Worksheet 2. Methyl Bromide

Purpose of Data: To establish a baseline estimate of crop/crop grouping yields, gross revenues, and costs using methyl bromide.

Instructions specific to each worksheet are located at the top of each sheet.

Worksheet	Title
2-A	**Methyl Bromide - Crop & Pest Information** If a consortium is submitting this application, the data for this table should reflect the **representative user** for the consortium. The purpose of this worksheet is to determine pest infestation and crop information where methyl bromide is used. This forms the baseline for evaluating the impacts of using an alternative to replace methyl bromide.
2-B	**Methyl Bromide - Historical Use 1997 - 2002** If a consortium is submitting this application, all data should reflect the **actual data** for the consortium. This worksheet provides data in actual usage for 1997-2002.
2-C	**Methyl Bromide - Crop/Crop grouping Yield and Gross Revenue for 2000-2002** If a consortium is submitting this application, the data for this table should reflect the **representative user** for the consortium. This worksheet provides crop/crop grouping yield and gross revenue for 2000 through 2002. The purpose of this worksheet is to determine past gross revenues when methyl bromide is used. This forms the baseline for evaluating the revenue impacts of using an alternative to replace methyl bromide.
2-D(1 & 2)	**Methyl Bromide - Baseline - Operating Costs for 2002** If a consortium is submitting this application, the data for this table should reflect the **representative user** for the consortium. This data is needed to estimate a baseline for operating costs in order to estimate **changes in costs** and the impact on operating profit and short-run economic viability as a result of not using methyl bromide and to provide required information to the international review board. The purpose of this worksheet is to determine operating expenses when methyl bromide is used. This forms the baseline for evaluating the cost impacts of using an alternative to replace methyl bromide. The data requested are designed to help you identify how your operation would change if methyl bromide were unavailable, which will be shown in Worksheet 3-B. Worksheet 2-D(1) is for users with a fumigation cycle of less than 5 years. Worksheet 2-D(2) is for users growing perennial crops following a single fumigation at establishment. **In collaboration with USDA, we will estimate fixed and overhead costs across crops and regions to ensure consistency within the U.S. nomination.**

Worksheet 2-A. Methyl Bromide - Crop & Pest Information

1. Crop/Crop Grouping or Consortium Conifer Transplants

2. Which month does your fumigation cycle start? (check only one)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
								X			

2. Fumigation and Crop Timeline

(**Indicate when fumigation, major crop and pest management practices typically occur by shading the appropriate cells.** Show a second crop if part of the fumigation cycle. If the fumigation cycle is longer than one year change the months to an appropriate interval. These tables are for annual crops but more than one crop may benefit from one methyl bromide fumigation. If application covers multiple crops/crop groupings not grown sequentially, they will need to provide this information for all crops/crop groupings. Please adjust timeline as necessary. **Please provide additional comments or description below or on a separate page.** Please begin the timeline with the first land preparation. For **perennials**, please begin with the **year** of land preparation and fumigation and indicate the years of

Beginning Fumigation Cycle	Time Interval (e.g. MONTH/YEAR/SEASON)											
	Year 1	Year 2	Year 3	Year 4								
Land Preparation												
Fumigation												
Planting												
Harvest												
Cover Crop												
Irrigation												
Fertilizer												
Pesticides												
Labor												

Continuation of Fumigation Cycle (if	Time Interval (e.g. MONTH/YEAR/SEASON)											
	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24
Land Preparation												
Fumigation												
Planting												
Harvest												
Fallow												
Other Key Crop Steps												
Other Key Pest Steps												

Comments:

Worksheet 2-A. Methyl Bromide - Crop & Pest Information

3. Target Pest(s) or Pest Problem(s): (Please identify the top target pests or pest problems. Provide at least common name and genus and species if possible. Additional pests or pest problems can be provided as an attachment.)

	Common Name	Genus	
Pest 1	Needle dieback	*Pythium spp*	
Pest 2	Phomopsis canker and foliage blight	*Phomopsis spp.*	
Pest 3	Phoma Blight	*Phoma spp.*	
Pest 4	Post-emergence damping-off	*Fusarium Spp.*	
Pest 5	Phytophthora root rot	*Phytophthora spp.*	

4. Pest Economic Threshold (Please provide the economic threshold information for each pest. Describe year and source of information such as survey or expert estimate.)

	Threshold	**Units** (e.g. pests/sq ft)	Year	Source
Pest 1				
Pest 2				
Pest 3				
Pest 4				
Pest 5				

5. Target Pest Infestation (Please estimate the percentage of the consortia's total growing area with a moderate to severe problem with these pests. Describe source of information such as a survey or expert estimate.)

	Percentage of Total Growing		Source
Pest 1	20	**%**	Cite source information
Pest 2	20	**%**	Cite source information
Pest 3	20	**%**	Cite source information
Pest 4	20	**%**	Cite source information
Pest 5	20	**%**	Cite source information

6. Representative User : (Please provide descriptive factors regarding your operation.)

Average Farm Size 100 **Acres**

Average acres in **this** crop 100 **Acres**

Average Area Treated with Methyl Bromide: 100 **Acres**

Describe a few crops that could follow **this** crop _____ _____

_____ _____

Other descriptive factors regarding representative user:

Worksheet 2-B. Methyl Bromide - Historical Use for 1997-2002

Column A:	**Total Actual Pounds a.i. of Methyl Bromide Applied per Year** Enter the total actual pounds active ingredient (a.i.) of methyl bromide applied. Note: This number should be the total pounds a.i. applied by the individual user or the entire consortium, for the year indicated. Include only the pounds active ingredient of methyl bromide. Do not include the pounds of chloropicrin that may be part of the same product.
Column B:	**Total Actual Acres Treated per Year** Enter the total actual acres treated. Note: This number should be the total actual acres treated by the individual user or total actual acres treated for the entire consortium, for the year indicated. For furrow treatment the acres should include the area between the rows as well as the area of the rows. i.e. acres treated is the area of the cultivated fields being treated including the area between rows even if they are not treated.
Column C:	**Average Pounds a.i. Applied per Area per Year** The average application rates in pounds a.i. of methyl bromide per area may be calculated by dividing Column A by Column B.

	A	B	C
Year	**Total Actual Pounds a.i. of Methyl Bromide Applied per Year**	**Total Actual Acres Treated per Year**	**Average Pounds a.i. Applied per Acre per Year**
1997	38500	110	350
1998	41600	130	320
1999	41600	130	320
2000	43000	140	350
2001	45000	150	300
2002	45000	150	300

What is the frequency of methyl bromide applied per area? (1x / year, 2x / year, 1x / 3 years, etc.)

___1_____ times per _____4 years_____

If there is a variation (greater than 10%) in the quantity a.i., the acres treated or average application rate from year to year, please explain the reasons for the variation.

Methyl Bromide production has increased over the years because of increase in acres treated and increased production.

Comments:

Worksheet 2-C. Methyl Bromide - Crop/Species Yield & Gross Revenue for 2000-2002

Column A:	**Year** Be sure to enter the year. Use as many rows as needed for each year for all the crops/crop groupings in the fumigation cycles from 2000 to 2002. If a fumigation cycle overlaps more than one calendar year, then the year of the fumigation cycle is the year methyl bromide was applied.
Column B:	**Crops/Crop Groupings** Enter all crops/crop groupings that benefit from methyl bromide in the fumigation cycle. If multiple crops/crop groupings are grown during the interval between fumigations (e.g. tomatoes followed by peppers in a single growing season, or strawberries followed by lettuce over 2 or 3 years) include all of the crops/crop groupings during the entire interval. If someone other than the applicant benefits from the application of methyl bromide in the fumigation cycle and you do not have the quantitative data for the crops/crop groupings grown on the same land, please indicate so in the comments section below.
Column C:	**Market Categories** Enter marketing categories that determine prices received, for example, grade (size, color), timeliness (early season, late season), or end use (fresh, processing). Itemize or aggregate these factors to the extent appropriate if lack of methyl bromide would effect the yields in each category.
Column D:	**Yield** Enter the yield per acre, or the proportion of total yields, obtained for that category. For perennial crops, please enter yields at full production. Be sure to indicate yields at other stages in the timeline in Worksheet 2-A.
Column E:	**Units of Measurement** Enter the unit of measurement for each crop/species (lbs, cwt, carton, bin). If not by weight, specify in the comments section the average weight of the measure.
Column F:	**Price** Enter average prices received by the users for that crop/crop grouping and market category. Average price over all categories can be calculated separately, if needed.
Column G:	**Gross Revenue** Gross revenue per acre for each market category and or each crop/crop grouping may be calculated using the data you entered as price times yield. If revenue is not equal to price times yield, you may enter a different revenue amount, but please explain the difference in the comments section below.

A	B	C	D	E	F	G
Year	**Crops/Crop Groupings**	**Market Category**	**Yield**	**Unit of Measurement**	**Price ($)**	**Gross Revenue per Acre ($)**
2000	Conifer Transplants		250	1,000 trees	$ 275.00	$68,750
2001	Conifer Transplants		250	1,000 trees	$ 285.00	$71,250
2002	Conifer Transplants		350	1,000 trees	$ 350.00	$122,500

If this application is for multiple crops/crop groupings (e.g. nurseries producing evergreens, deciduous, and forbs) please indicate the proportion of land area allocated to each crop/crop grouping.

Comments:

Worksheet 2-D(1&2). Methyl Bromide - Baseline - Operating Costs for 2002

Enter all operating costs incurred during a fumigation cycle. Users with a relatively short fumigation cycle (less than five years) should use version D(1); users cultivating perennial crops should use version D(2). Users with multiple crops, either on the same area in a single fumigation cycle or on different areas treated separately, should copy this sheet and provide costs for each crop. If multiple crops are cultivated sequentially following a single fumigation, replace fumigation costs in Pre-plant Operations with any additional pest control costs used prior to the following crops. If a fallow season is an important part of the fumigation cycle, include costs incurred (for example, cultivating a cover crop) as a separate line or as a separate sheet, if costs are extensive. **Please fill in the unshaded areas. The shaded areas can be used if the information is known.**

Column A:	**Operation / Input** The operations/inputs listed here are not meant to be exhaustive or representative of your specific production system. They are meant to provide suggestions and to help you identify how your operation would change if methyl bromide were unavailable. Be as precise as necessary otherwise you may aggregate operations or inputs. For example, specify herbicide costs if additional treatments would become necessary with the use of a methyl bromide alternative, otherwise you may simply specify total pesticide costs. **Please specify only variable operating costs.**
	Operation / Input for Perennial Crops For perennial crops (Worksheet D(2)), we have divided the lifespan into three basic periods: pre-production (including establishment), initial production, and full production. Please ensure that the timeline in Worksheet 2-A indicates the years of each period. Operating costs should be an average of costs incurred during each period. Please consider expected replanting rates and indicate which year dead or poorly performing young trees would be replaced. You may copy columns/rows as needed if these periods need to be refined for your situation.
Column B:	**Quantity Used per Acre** This field is required only for methyl bromide. However, you may include specific amounts of other inputs or operations if you believe it helps to document the additional costs you would incur by using an alternative fumigant.
	Constant Cost per Acre For harvest operations, specify costs that depend on land area, for example, picking costs, per acre of land.
Column C:	**Units** For all inputs and operations detailed in Column B, please specify the units of measurement.
	Cost per Unit of Yield For harvest operations, specify costs that depend on amount of product harvested, for example, packing material, per unit of produce.
Column D:	**Unit Costs** For all inputs and operations detailed in Column B, please specify the unit cost. Also, indicate all costs of applying methyl bromide, including any material costs, for example, tarps. If custom applied and separate costs are unavailable, write 'custom' and enter total cost in Column E.
	Yield For harvest operations, indicate average yields or representative yields from Worksheet 2-C.
Column E:	**Total Cost per Acre** For inputs and operations detailed in Columns B and D, total costs can be calculated as Column B times Column D. Otherwise, enter total cost of the input or operation. **As a check, you may add up Column E to obtain an estimate of total variable operating costs. These will not include fixed and overhead costs, nor a return to the owners' labor. It should, therefore, be less than gross revenues calculated in Worksheet 2-C. If it is not, please explain (for example, unusually poor yields or unusually poor prices).** For perennial crops, Column E should only be totaled for the years at full production.
	Total Cost per Acre Harvest costs may likewise be calculated as costs per acre (Column B) plus variable costs per unit of yield (Column C) times yield (Column D).

Worksheet 2-D(1). Methyl Bromide - Baseline - Operating Costs for 2002

A	B	C	D	E
Operation / Input	**Quantity Used per Acre**	**Units (lbs, hours, etc)**	**Unit Cost ($)**	**Total Cost per Acre ($)**
Pre-plant Operations				
Land preparation				$500.00
Fumigation				
product (methyl bromide)	300	lbs	$2.50	$127.50
application				$200.00
Irrigation				
Other costs				
Cultural Operations				
Seed / Seedlings				$1,974.00
Fertilizer / Soil Amendments				$622.00
Pesticides				
Insecticide				$101.00
Herbicide				$137.00
Fungicide				$747.00
Nematicide				
Irrigation				$271.00
Labor (manual)				$8,000.00
Fuel / Machine Labor				$169.00
Equipment				$1,091.00
Harvest Operations	**Constant Cost per Acre ($)**	**Cost per Unit of Yield ($)**	**Yield**	**Total Cost per Acre ($)**
Labor				$1,500.00
Hauling				
Material				
Grading / Packing / Storage				$575.00
Other Costs				$500.00

Worksheet 2-D(2). Methyl Bromide - Baseline - Operating Costs for Perennial Crops

A	B (1)	C (1)	D (1)	E (1)	B (2)	C (2)	D (2)	E (2)	B (3)	C (3)	D (3)	E (3)
	PRE PRODUCTION YEARS _____				**INITIAL PRODUCTION YEARS _____**				**FULL PRODUCTION YEARS _____**			
Operation or Input	**Quantity used per acre**	**Units (lbs, hours, etc)**	**Unit Cost**	**Total Cost per Acre**	**Quantity used per acre**	**Units (lbs, hours, etc)**	**Unit Cost**	**Total Cost per Acre**	**Quantity used per acre**	**Units (lbs, hours, etc)**	**Unit Cost**	**Total Cost per Acre**
Establishment Operations												
Land preparation												
Fumigation												
product												
application												
Irrigation												
Seedlings												
Other costs												
Cultural Operations												
Fertilizer/soil amendments												
Pesticides												
Insecticide												
Herbicide												
Fungicide												
Nematicide												
Irrigation												
Labor (manual)												
Fuel/machine labor												
Other costs												
Harvest Operations	**Constant Cost per Acre**	**Cost per Unit of Yield**	**Yield**	**Total Cost**	**Constant Cost per Acre**	**Cost per Unit of Yield**	**Yield**	**Total Cost**	**Constant Cost per Acre**	**Cost per Unit of Yield**	**Yield**	**Total Cost**
Picking/hauling												
Material												
Grading/packing												
Other costs												

Worksheet 3. Alternatives - Feasibility of Alternative Pest Control Regimens

Purpose of Data: To estimate the loss as a result of not having methyl bromide available. EPA needs to compare data (yields, crop/species prices, gross revenues and costs) on the use of methyl bromide and alternative pest control regimens.

Complete worksheet 3-A for each alternative pest control regimen listed in the "U.S. Matrix" for chemical controls (www.epa.gov/ozone/mbr/cueqa.html) and the "International Matrix" for non-chemical pest controls (www.epa.gov/ozone/mbr/cue). Each worksheet contains a place holder in the title for you to insert the name of the specific alternative pest control regimen addressed. You should add additional worksheets as required.

Enter all alternative pesticides and pest control methods (and associated cost and yield data) that would replace one treatment of methyl bromide throughout the fumigation cycle. See the Definition worksheet for a comprehensive definition on fumigation cycles.

Worksheet	Title
3-A	**Alternatives - Technical Feasibility of Alternatives to Methyl Bromide** You must complete one worksheet for each alternative. Please inset the name of the alternative in the area on top of the page. If you prefer, you may provide the information requested in this worksheet in a narrative review. However, you must fill in the information in Question #1 and #3 or we will assume no yield or quality loss.
3-B	**Alternatives - Changes in Operating Costs** If a consortium is submitting this application, the data for this table should reflect the **representative user** for the consortium. This data is needed to estimate **changes in costs** and the impact on operating profit and short-run economic viability as a result of not using methyl bromide and to provide required information to the international review board. **Please fill out this worksheet for each alternative specified in the U.S. Matrix and for other alternatives for which the economic evaluation would bolster the case that methyl bromide is needed.** The purpose of this worksheet is to determine operating expenses when alternatives are used for evaluating the cost impacts of using an alternative to replace methyl bromide. The data requested are designed to help you identify how your operation would change if methyl bromide were unavailable. Worksheet 3-B(1) is for users with a fumigation cycle of less than 5 years. Worksheet 3-B(2) is for users growing perennial crops following a single fumigation at establishment. **In collaboration with USDA, we will estimate fixed and overhead costs across crops and regions to ensure consistency within the U.S. nomination.**

Worksheet 3-A(1). Alternatives - Technical Feasibility of Alternatives to Methyl Bromide

Alternative: Metam Sodium

1. Yield Loss & Pest Control When Comparing This Alternative to Methyl Bromide

Provide numerical estimates where possible.

Study # (list below)	Pest Being Tested	% Yield Loss *	% Pest Control *	Details
1	Pythium/Fusarium	9%		
2				
3				
4				
5				
Enter Average Loss		9%		

* If no yield or quality loss information is given we will assume no losses. Only provide pest control information if yield or quality loss information is

2. Study Information

For the information in #1 above list: the study name, authors, publication, date, and if a copy is attached.

Study #	Attached?	Details
1	X	Tree Planter's Note, Volume 39, Sally J. Campbell and Bruce R. Kelpsas
2		
3		
4		
5		

3. Quality Loss *

Describe quality impacts such as: percent smaller fruit, reduced grade, smaller plants, crop damage, disease vector, etc. **Refer to market category question in Worksheet 2-C.**

Market Category	Yield with Methyl Bromide	Units	Yield With Alternative	Units	Quality Impact Description
Conifer Seedlings	350	1,000 trees	318	1,000 trees	

4. Are there any production delays (planting/ harvesting) associated with this alternative?

Yes [ ] No [X] (If yes, please explain) _____

5. Are there any variety or cultivar issues associated with this alternative?

_____

6. Restrictions on Alternative Use

This information will be used to determine the amount of methyl bromide needed.

	% of Area	Details
Regulatory Restriction		
- Label Restriction		
- Township Caps		
Soil Restriction		
Pest Resistant To Alternative		
Organic Matter Restriction		
Off Site Damage (outgassing)		
Other Restrictions (Describe)		

Worksheet 3-A(1). Alternatives - Technical Feasibility of Alternatives to Methyl Bromide

Alternative: Metam Sodium

7. Use Rate of Chemical Alternative

Active Ingredient (a.i.)	Name of Product and Formulation	Quantity a.i. per Acre	Units (gals, lbs. Etc.)	# of Acres Treated	# of Applications
Metam Sodium	Vapam (42% Metam Sodium, 52% Inert)	450	lbs	100	1

8. Non-Chemical Pest Control (please describe)

9. Alternative Timeline

(**Indicate when fumigation, major crop and pest management practices typically occur by shading the appropriate cells.** Show a second crop if part of the fumigation cycle. If the fumigation cycle is longer than one year change the months to an appropriate interval. These tables are for annual crops but more than one crop may benefit from one methyl bromide fumigation. If application covers multiple crops/crop groupings not grown sequentially, they will need to provide this information for all crops/crop groupings. Please adjust timeline as necessary. **Please provide additional comments or description below or on a separate page.** Please begin the timeline with the first land preparation. For **perennials**, please begin with the **year** of land preparation and fumigation and indicate the years of production by yield or percentage of full production.)

Beginning Fumigation Cycle	Time Interval (e.g. MONTH/YEAR/SEASON)											
	Year 1	Year 2	Year 3	Year 4								
Land Preparation												
Fumigation												
Planting												
Harvest												
Cover Crop												
Irrigation												
Fertilizer												
Pesticides												
Labor												

Continuation of Alternative Cycle (if needed)	Time Interval (e.g. MONTH/YEAR/SEASON)											
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Land Preparation												
Fumigation												
Planting												
Harvest												
Fallow												
Other Key Crop Steps												
Other Key Pest Steps												

Comments:

Worksheet 3-B(1&2)(1). Alternatives - Changes in Operating Costs

Alternative: Metam Sodium

Enter all operating costs incurred during a fumigation cycle. Users with a relatively short fumigation cycle (less than five years) should use version B(1); users cultivating perennial crops should use version B(2). Users with multiple crops, either on the same area in a single fumigation cycle or on different areas treated separately, should copy this sheet and provide costs for each crop. If multiple crops are cultivated sequentially following a single fumigation, replace fumigation costs in pre plant Operations with any additional pest control costs used prior to the following crops. If a fallow season is an important part of the fumigation cycle, include costs incurred (for example, cultivating a cover crop) as a separate line or as a separate sheet, if costs are extensive. **Please fill in the unshaded areas. The shaded areas can be used if the information is known.**

Column A:	**Operation / Input** The operations/inputs listed here are not meant to be exhaustive or representative of your specific production system. They are meant to provide suggestions and to help you identify how your operation would change if methyl bromide were unavailable. Be as precise as necessary otherwise you may aggregate operations or inputs. For example, specify herbicide costs if additional treatments would become necessary with the use of a methyl bromide alternative, otherwise you may simply specify total pesticide costs. **Please specify only variable operating costs.**
	Operation / Input for Perennial Crops For perennial crops (Worksheet B(2)), we have divided the lifespan into three basic periods: pre-production (including establishment), initial production, and full production. Please ensure that the timeline in Worksheet 3-A indicates the years of each period. Operating costs should be an average of costs incurred during each period. Please consider expected replanting rates and indicate which year dead or poorly performing young trees would be replaced. You may copy columns/rows as needed if these periods need to be refined for your situation.
Column B:	**Quantity Used per Acre** This field is required only for methyl bromide. However, you may include specific amounts of other inputs or operations if you believe it helps to document the additional costs you would incur by using an alternative fumigant.
	Constant Cost per Acre For harvest operations, specify costs that depend on land area, for example, picking costs, per acre of land.
Column C:	**Units** For all inputs and operations detailed in Column B, please specify the units of measurement.
	Cost per Unit of Yield For harvest operations, specify costs that depend on amount of product harvested, for example, packing material, per unit of produce.
Column D:	**Unit Costs** For all inputs and operations detailed in Column B, please specify the unit cost. Also, indicate all costs of applying methyl bromide, including any material costs, for example, tarps. If custom applied and separate costs are unavailable, write 'custom' and enter total cost in Column E.
	Yield For harvest operations, indicate average yields or representative yields from Worksheet 3-A.
Column E:	**Total Cost per Acre** For inputs and operations detailed in Columns B and D, total costs can be calculated as Column B times Column D. Otherwise, enter total cost of the input or operation. As a check, you may add up Column E to obtain an estimate of total variable operating costs. These will not include fixed and overhead costs, nor a return to the owners' labor. It should, therefore, be less than gross revenues calculated in Worksheet 2-C. If it is not, please explain (for example, unusually poor yields or unusually poor prices). For perennial crops, Column E should only be totaled for the years at full production.
	Total Cost per Acre Harvest costs may likewise be calculated as costs per acre (Column B) plus variable costs per unit of yield (Column C) times yield (Column D).

Worksheet 3-B(1)(1). Alternatives - Changes in Operating Costs

Alternative: Metam Sodium

A	B	C	D	E
Operation / Input	**Quantity Used per Acre**	**Units (lbs, hours, etc)**	**Unit Cost ($)**	**Total Cost per Acre ($)**
Pre-plant Operations				
Land preparation				$500.00
Fumigation				
product (metam sodium)	450	lbs	$6.25	$437.50*
application				
Irrigation				
Other costs				
Cultural Operations				
Seed / Seedlings				$1,974.00
Fertilizer / Soil Amendments				$622.00
Pesticides				
Insecticide				$101.00
Herbicide				$237.00*
Fungicide				$747.00
Nematicide				
Irrigation				$271.00
Labor (manual)				$8100.00*
Fuel / Machine Labor				$169.00
Other Costs				$1,091.00
Harvest Operations	**Constant Cost per Acre ($)**	**Cost per Unit of Yield ($)**	**Yield**	**Total Cost per Acre ($)**
Labor				$1365.00*
Hauling				
Material				
Grading / Packing / Storage				$523.25*
Other Costs				$455.00*
* These costs have changed from the baseline. Herbicide and labor increased due to increased need for pest control. Harvest costs decreased by 9% in accordance with a 9% yield decrease.				

Worksheet 3-B(2). Alternatives - Changes in Operating Costs for Perennial Crops

Alternative: [Insert Alternative]

A	B (1)	C (1)	D (1)	E (1)	B (2)	C (2)	D (2)	E (2)	B (3)	C (3)	D (3)	E (3)
	PRE PRODUCTION YEARS _____				INITIAL PRODUCTION YEARS _____				FULL PRODUCTION YEARS _____			
Operation or Input	**Quantity used per acre**	**Units (lbs, hours, etc)**	**Unit Cost**	**Total Cost per Acre**	**Quantity used per acre**	**Units (lbs, hours, etc)**	**Unit Cost**	**Total Cost per Acre**	**Quantity used per acre**	**Units (lbs, hours, etc)**	**Unit Cost**	**Total Cost per Acre**
Establishment Operations												
Land preparation												
Fumigation												
product												
application												
Irrigation												
Seedlings												
Other costs												
Cultural Operations												
Fertilizer/soil amendments												
Pesticides												
Insecticide												
Herbicide												
Fungicide												
Nematicide												
Irrigation												
Labor (manual)												
Fuel/machine labor												
Other costs												
Harvest Operations	**Constant Cost per Acre**	**Cost per Unit of Yield**	**Yield**	**Total Cost**	**Constant Cost per Acre**	**Cost per Unit of Yield**	**Yield**	**Total Cost**	**Constant Cost per Acre**	**Cost per Unit of Yield**	**Yield**	**Total Cost**
Picking/hauling												
Material												
Grading/packing												
Other costs												

Worksheet 3-A(2). Alternatives - Technical Feasibility of Alternatives to Methyl Bromide

Alternative: Dazomet

1. Yield Loss & Pest Control When Comparing This Alternative to Methyl Bromide

Provide numerical estimates where possible.

Study # (list below)	Pest Being Tested	% Yield Loss *	% Pest Control *	Details
1	Pythium/Fusarium	6%		Phythium was well controlled, but Fusarium was nc
2				
3				
4				
5				
Enter Average Loss		6%		

* If no yield or quality loss information is given we will assume no losses. Only provide pest control information if yield or quality loss information

2. Study Information

For the information in #1 above list: the study name, authors, publication, date, and if a copy is attached.

Study #	Attached?	Details
1		Tree Planters' Notes v. 39 (1988), Sally J. Campbell and Bruce R. Kelpsas
2		
3		
4		
5		

3. Quality Loss *

Describe quality impacts such as: percent smaller fruit, reduced grade, smaller plants, crop damage, disease vector, etc. **Refer to market category question in Worksheet 2-C.**

Market Category	Yield with Methyl Bromide	Units	Yield With Alternative	Units	Quality Impact Description
Conifer Seedlings	350	1,000 trees	330	1,000 trees	

4. Are there any production delays (planting/ harvesting) associated with this alternative?

Yes [ ] No [X] (If yes, please explain)

5. Are there any variety or cultivar issues associated with this alternative?

6. Restrictions on Alternative Use

This information will be used to determine the amount of methyl bromide needed.

	% of Area	Details
Regulatory Restriction		
- Label Restriction		
- Township Caps		
Soil Restriction		
Pest Resistant To Alternative		
Organic Matter Restriction		
Off Site Damage (outgassing)		
Other Restrictions (Describe)		

Worksheet 3-A(2). Alternatives - Technical Feasibility of Alternatives to Methyl Bromide

Alternative: **Dazomet**

7. Use Rate of Chemical Alternative

Active Ingredient (a.i.)	Name of Product and Formulation	Quantity a.i. per Acre	Units (gals, lbs. Etc.)	# of Acres Treated	# of Applications
Dazomet	Basamid (98% Dazomet)	350	lbs	100	1

8. Non-Chemical Pest Control (please describe)

9. Alternative Timeline

(**Indicate when fumigation, major crop and pest management practices typically occur by shading the appropriate cells.** Show a second crop if part of the fumigation cycle. If the fumigation cycle is longer than one year change the months to an appropriate interval. These tables are for annual crops but more than one crop may benefit from one methyl bromide fumigation. If application covers multiple crops/crop groupings not grown sequentially, they will need to provide this information for all crops/crop groupings. Please adjust timeline as necessary. **Please provide additional comments or description below or on a separate page.** Please begin the timeline with the first land preparation. For **perennials**, please begin with the **year** of land preparation and fumigation and indicate the years of production by yield or percentage of full

Beginning Fumigation Cycle	Time Interval (e.g. MONTH/YEAR/SEASON)											
	Year 1	Year 2	Year 3	Year 4								
Land Preparation												
Fumigation												
Planting												
Harvest												
Cover Crop												
Irrigation												
Fertilizer												
Pesticides												
Labor												

Continuation of Alternative Cycle (if needed)	Time Interval (e.g. MONTH/YEAR/SEASON)											
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Land Preparation												
Fumigation												
Planting												
Harvest												
Fallow												
Other Key Crop Steps												
Other Key Pest Steps												

Comments:

Worksheet 3-B(1&2)(2). Alternatives - Changes in Operating Costs

Alternative: Dazomet

Enter all operating costs incurred during a fumigation cycle. Users with a relatively short fumigation cycle (less than five years) should use version B(1); users cultivating perennial crops should use version B(2). Users with multiple crops, either on the same area in a single fumigation cycle or on different areas treated separately, should copy this sheet and provide costs for each crop. If multiple crops are cultivated sequentially following a single fumigation, replace fumigation costs in pre plant Operations with any additional pest control costs used prior to the following crops. If a fallow season is an important part of the fumigation cycle, include costs incurred (for example, cultivating a cover crop) as a separate line or as a separate sheet, if costs are extensive. **Please fill in the unshaded areas. The shaded areas can be used if the information is known.**

Column A:	**Operation / Input** The operations/inputs listed here are not meant to be exhaustive or representative of your specific production system. They are meant to provide suggestions and to help you identify how your operation would change if methyl bromide were unavailable. Be as precise as necessary otherwise you may aggregate operations or inputs. For example, specify herbicide costs if additional treatments would become necessary with the use of a methyl bromide alternative, otherwise you may simply specify total pesticide costs. **Please specify only variable operating costs.**
	Operation / Input for Perennial Crops For perennial crops (Worksheet B(2)), we have divided the lifespan into three basic periods: pre-production (including establishment), initial production, and full production. Please ensure that the timeline in Worksheet 3-A indicates the years of each period. Operating costs should be an average of costs incurred during each period. Please consider expected replanting rates and indicate which year dead or poorly performing young trees would be replaced. You may copy columns/rows as needed if these periods need to be refined for your situation.
Column B:	**Quantity Used per Acre** This field is required only for methyl bromide. However, you may include specific amounts of other inputs or operations if you believe it helps to document the additional costs you would incur by using an alternative fumigant.
	Constant Cost per Acre For harvest operations, specify costs that depend on land area, for example, picking costs, per acre of land.
Column C:	**Units** For all inputs and operations detailed in Column B, please specify the units of measurement.
	Cost per Unit of Yield For harvest operations, specify costs that depend on amount of product harvested, for example, packing material, per unit of produce.
Column D:	**Unit Costs** For all inputs and operations detailed in Column B, please specify the unit cost. Also, indicate all costs of applying methyl bromide, including any material costs, for example, tarps. If custom applied and separate costs are unavailable, write 'custom'
	Yield For harvest operations, indicate average yields or representative yields from Worksheet 3-A.
Column E:	**Total Cost per Acre** For inputs and operations detailed in Columns B and D, total costs can be calculated as Column B times Column D. Otherwise, enter total cost of the input or operation. As a check, you may add up Column E to obtain an estimate of total variable operating costs. These will not include fixed and overhead costs, nor a return to the owners' labor. It should, therefore, be less than gross revenues calculated in Worksheet 2-C. If it is not, please explain (for example, unusually poor yields or unusually poor prices). For perennial crops, Column E should only be totaled for the years at full production.
	Total Cost per Acre Harvest costs may likewise be calculated as costs per acre (Column B) plus variable costs per unit of yield (Column C) times yield (Column D).

Worksheet 3-B(1)(2). Alternatives - Changes in Operating Costs

Alternative: Dazomet

A	B	C	D	E
Operation / Input	**Quantity Used per Acre**	**Units (lbs, hours, etc)**	**Unit Cost ($)**	**Total Cost per Acre ($)**
Pre-plant Operations				
Land preparation				$500.00
Fumigation				
product (dazomet)	250	lbs	$450.00	$281.25
application				$225.00
Irrigation				
Other costs				
Cultural Operations				
Seed / Seedlings				$1,974.00
Fertilizer / Soil Amendments				$622.00
Pesticides				
Insecticide				$101.00
Herbicide				$237.00*
Fungicide				$747.00
Nematicide				
Irrigation				$271.00
Labor (manual)				$8100.00*
Fuel / Machine Labor				$169.00
Other Costs				$1,091.00
Harvest Operations	**Constant Cost per Acre ($)**	**Cost per Unit of Yield ($)**	**Yield**	**Total Cost per Acre ($)**
Labor				$1410.00*
Hauling				
Material				
Grading / Packing / Storage				$540.50*
Other Costs				$470.00*

* These costs have changed from the baseline. Herbicide and labor increased due to increased need for pest control. Harvest costs decreased by 6% in accordance with a 6% yield decrease.

Worksheet 3-A(3). Alternatives - Technical Feasibility of Alternatives to Methyl Bromide

Alternative: Biofumigation

1. Yield Loss & Pest Control When Comparing This Alternative to Methyl Bromide

Provide numerical estimates where possible.

Study # (list below)	Pest Being Tested	% Yield Loss *	% Pest Control *	Details
1	Pythium/Fusarium	8%		Bio fumigation does not control all the pest addressed by Methyl Bromide.
2				
3				
4				
5				
Enter Average Loss		8%		

* If no yield or quality loss information is given we will assume no losses. Only provide pest control information if yield or quality loss information

2. Study Information

For the information in #1 above list: the study name, authors, publication, date, and if a copy is attached.

Study #	Attached?	Details
1	X	"The Effect of Biofumigation on Pest Control," Professor James Smith, 2000
2		
3		
4		
5		

3. Quality Loss *

Describe quality impacts such as: percent smaller fruit, reduced grade, smaller plants, crop damage, disease vector, etc. **Refer to market category question in Worksheet 2-C.**

Market Category	Yield with Methyl Bromide	Units	Yield With Alternative	Units	Quality Impact Description
Conifer Seedlings	350	1,000 trees	322	1,000 trees	

4. Are there any production delays (planting/ harvesting) associated with this alternative?

Yes [ ] No [X] (If yes, please explain)

5. Are there any variety or cultivar issues associated with this alternative?

6. Restrictions on Alternative Use

This information will be used to determine the amount of methyl bromide needed.

	% of Area	Details
Regulatory Restriction		
- Label Restriction		
- Township Caps		
Soil Restriction		
Pest Resistant To Alternative		
Organic Matter Restriction		
Off Site Damage (outgassing)		
Other Restrictions (Describe)		

Worksheet 3-A(3). Alternatives - Technical Feasibility of Alternatives to Methyl Bromide

Alternative: Biofumigation

7. Use Rate of Chemical Alternative

Active Ingredient (a.i.)	Name of Product and Formulation	Quantity a.i. per Acre	Units (gals, lbs. Etc.)	# of Acres Treated	# of Applications

8. Non-Chemical Pest Control (please describe)

Biofumigation is the use of plants (cover crops) containing biologically active compounds as rotation crops or green manures to suppress soil-borne pests and diseases.

9. Alternative Timeline

(**Indicate when fumigation, major crop and pest management practices typically occur by shading the appropriate cells.** Show a second crop if part of the fumigation cycle. If the fumigation cycle is longer than one year change the months to an appropriate interval. These tables are for annual crops but more than one crop may benefit from one methyl bromide fumigation. If application covers multiple crops/crop groupings not grown sequentially, they will need to provide this information for all crops/crop groupings. Please adjust timeline as necessary. **Please provide additional comments or description below or on a separate page.** Please begin the timeline with the first land preparation. For **perennials**, please begin with the **year** of land preparation and fumigation and indicate the years of production by yield or percentage of full

Beginning Fumigation Cycle	Time Interval (e.g. MONTH/YEAR/SEASON)											
	Year 1	Year 2	Year 3	Year 4								
Land Preparation												
Fumigation												
Planting												
Harvest												
Cover Crop												
Irrigation												
Fertilizer												
Pesticides												
Labor												

Continuation of Alternative Cycle (if needed)	Time Interval (e.g. MONTH/YEAR/SEASON)											
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Land Preparation												
Fumigation												
Planting												
Harvest												
Fallow												
Other Key Crop Steps												
Other Key Pest Steps												

Comments:

The study conducted results in marshy area, while in our consortium the soil is largely sandy. We therefore, do n the results of the study to apply very well to our area.

Worksheet 3-B(1&2)(3). Alternatives - Changes in Operating Costs

Alternative: Biofumigation

Enter all operating costs incurred during a fumigation cycle. Users with a relatively short fumigation cycle (less than five years) should use version B(1); users cultivating perennial crops should use version B(2). Users with multiple crops, either on the same area in a single fumigation cycle or on different areas treated separately, should copy this sheet and provide costs for each crop. If multiple crops are cultivated sequentially following a single fumigation, replace fumigation costs in pre plant Operations with any additional pest control costs used prior to the following crops. If a fallow season is an important part of the fumigation cycle, include costs incurred (for example, cultivating a cover crop) as a separate line or as a separate sheet, if costs are extensive. **Please fill in the unshaded areas. The shaded areas can be used if the information is known.**

Column A:	**Operation / Input** The operations/inputs listed here are not meant to be exhaustive or representative of your specific production system. They are meant to provide suggestions and to help you identify how your operation would change if methyl bromide were unavailable. Be as precise as necessary otherwise you may aggregate operations or inputs. For example, specify herbicide costs if additional treatments would become necessary with the use of a methyl bromide alternative, otherwise you may simply specify total pesticide costs. **Please specify only variable operating costs.**
	Operation / Input for Perennial Crops For perennial crops (Worksheet B(2)), we have divided the lifespan into three basic periods: pre-production (including establishment), initial production, and full production. Please ensure that the timeline in Worksheet 3-A indicates the years of each period. Operating costs should be an average of costs incurred during each period. Please consider expected replanting rates and indicate which year dead or poorly performing young trees would be replaced. You may copy columns/rows as needed if these periods need to be refined for your situation.
Column B:	**Quantity Used per Acre** This field is required only for methyl bromide. However, you may include specific amounts of other inputs or operations if you believe it helps to document the additional costs you would incur by using an alternative fumigant.
	Constant Cost per Acre For harvest operations, specify costs that depend on land area, for example, picking costs, per acre of land.
Column C:	**Units** For all inputs and operations detailed in Column B, please specify the units of measurement.
	Cost per Unit of Yield For harvest operations, specify costs that depend on amount of product harvested, for example, packing material, per unit of produce.
Column D:	**Unit Costs** For all inputs and operations detailed in Column B, please specify the unit cost. Also, indicate all costs of applying methyl bromide, including any material costs, for example, tarps. If custom applied and separate costs are unavailable, write 'custom'
	Yield For harvest operations, indicate average yields or representative yields from Worksheet 3-A.
Column E:	**Total Cost per Acre** For inputs and operations detailed in Columns B and D, total costs can be calculated as Column B times Column D. Otherwise, enter total cost of the input or operation. As a check, you may add up Column E to obtain an estimate of total variable operating costs. These will not include fixed and overhead costs, nor a return to the owners' labor. It should, therefore, be less than gross revenues calculated in Worksheet 2-C. If it is not, please explain (for example, unusually poor yields or unusually poor prices). For perennial crops, Column E should only be totaled for the years at full production.
	Total Cost per Acre Harvest costs may likewise be calculated as costs per acre (Column B) plus variable costs per unit of yield (Column C) times yield (Column D).

Worksheet 3-B(1)(3). Alternatives - Changes in Operating Costs

Alternative: Biofumigation

A	B	C	D	E
Operation / Input	**Quantity Used per Acre**	**Units (lbs, hours, etc)**	**Unit Cost ($)**	**Total Cost per Acre ($)**
Pre-plant Operations				
Land preparation				$500.00
Fumigation				
product (methyl bromide)				$387.50
application				
Irrigation				
Other costs				
Cultural Operations				
Seed / Seedlings				$1,974.00
Fertilizer / Soil Amendments				$622.00
Pesticides				
Insecticide				$101.00
Herbicide				$237.00*
Fungicide				$747.00
Nematicide				
Irrigation				$271.00
Labor (manual)				$8100.00*
Fuel / Machine Labor				$169.00
Other Costs				$1,091.00
Harvest Operations	**Constant Cost per Acre ($)**	**Cost per Unit of Yield ($)**	**Yield**	**Total Cost per Acre ($)**
Labor				$1380.00*
Hauling				
Material				
Grading / Packing / Storage				$529.00*
Other Costs				$460.00*
* These costs have changed from the baseline. Herbicide and labor increased due to increased need for pest control. Harvest costs decreased by 8% in accordance with a 8% yield decrease.				

Worksheet 4. Future Research Plans

Please describe future plans to test alternatives to methyl bromide. You may use this worksheet to describe all

1. Identify the top 3 to 5 target pests for your research.

1	Phythium	4	
2	Fusarium	5	
3			

2. Provide a list of alternative chemicals or cultural practices that have been tested.

1	Metam Sodium	4	
2	Dazomet	5	
3	Biofumigation		

3. Prioritize the alternative chemicals or cultural practices to be tested.

1	Dazomet	4	
2		5	
3			

4. What would be the best currently available alternative if methyl bromide were not available?

Dazomet

5. Please provide an overview/timeline of the plan to transition away from using methyl bromide.

6. Will yield/quality loss be measured? Yes [X] No [ ]

7. Will economic impacts be measured? Yes [X] No [ ]

8. How will you minimize your use and/or emissions of methyl bromide?

(check all that apply)

[ ]	Formulation Changes (please specify)	
[X]	Tarpaulin (High Density Polyethylene)	
[X]	Virtually Impermeable Film (VIF)	
[ ]	Other	
[X]	Cultural Practices (please specify)	Timing of sowing, depth of sowing
[X]	Other Pesticides (please specify)	Basamid and Metam Sodium
[X]	Non-Chemical Methods (please specify)	Fallow and organic amendments, various seedbed coverings

Formulation Changes

From: ____% methyl bromide, _____% chloropicri

To: ____% methyl bromide, _____% chloropicri

9. What is the cumulative amount spent and the types of contributions this consortium has made to fund research to develop alternatives to methyl bromide since 1992? (e.g. consortium dues, direct research

Years	Name of Organization / Research Institution	Amount ($)
1992-2003	Various	$90,000

10. Other total investments, if any, made to reduce your reliance on methyl bromide? $2,500

(Describe each investment and its associated costs. e.g. specialized machinery, etc.)

Investment	Cost
Alternative weed control methods	$2,500

11. Grant requests made to USDA, EPA, state, or other funding group.

None

Worksheet 5. Application Summary

This worksheet will be posted on the web to notify the public of requests for critical use exemptions beyond the 2005 phase out for methyl bromide. Therefore, this worksheet cannot be claimed as CBI.

1. **Consortium Name:** Nursery Association
2. **Location:** California and Utah
3. **Crop:** Conifer Seedlings
4. **Pounds of Methyl Bromide Requested** **2005** 25,000 **lbs.**
5. **Acres Treated with Methyl Bromide** **2005** 100 **Acres**
6. **If methyl bromide is requested for additional years, reason for request:**

Specific sections of seedling production areas are fumigated each year. The request for a Critical Use Exemption is based on this annual application requirement.

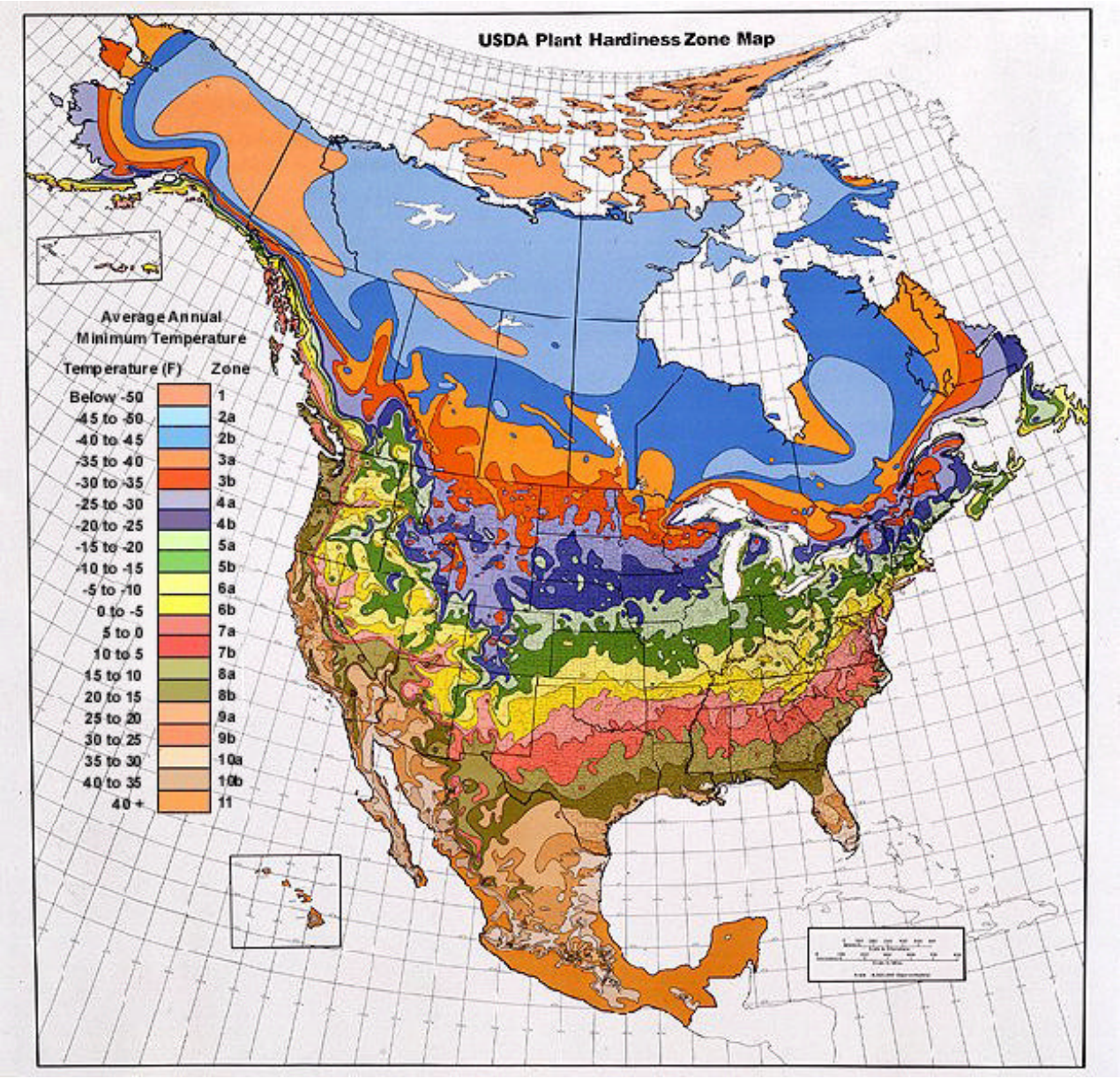
2006 25,000 **lbs.** **Area Treated** 100 **Acres**
2007 25,000 **Area Treated** 100 **Acres**

Place an "X" in the column(s) labeled "Not Technically Feasible" and/or "Not Economically Feasible" where appropriate. Use the "Reasons" column to describe why the potential alternative is not feasible.

Potential Alternatives	Not Technically Feasible	Not Economically Feasible	Reasons
Metam Sodium		X	
Dazomet		X	
Biofumigation		X	

Definitions:

Fumigation cycle:	The period of time between methyl bromide fumigations.
Year:	If a fumigation cycle overlaps more than one calendar year, "year" refers to the calendar year when methyl bromide is applied (or the beginning of the cycle).
Comparable data:	In order to compare revenues and costs with and without methyl bromide, data on alternatives for pest control, yields, revenues, and costs must be for the same time interval as the methyl bromide fumigation cycle. If, however, quantitative data, is not available for the entire fumigation cycle, then to be comparable, the quantitative data for the alternatives should cover the same portion of the fumigation cycle as the quantitative data for methyl bromide, and the rest of the cycle should be discussed in the comments sections.
2-year example:	If a methyl bromide fumigation is made every 2 years, then the 2001 fumigation cycle began in 2001 and would end in 2003. The data should cover the methyl bromide costs and usage for the methyl bromide fumigation made in 2001, and all yields and revenues received and other costs incurred during the 2 year period. To be comparable, the data on alternatives should cover a similar 2 year period beginning in 2005 beginning at the same time of year when a methyl bromide fumigation would be made. The data should cover all methyl bromide alternatives used, and all yields and revenues received during that 2-year interval. Other pest control and other costs would only need to be provided for that interval if they would change from what they were with methyl bromide.
Other beneficiary example	If someone other than the applicant benefits from a methyl bromide fumigation, you should comment on these benefits if you do not have quantitative data for the entire fumigation cycle. For example, if a rotational crop in the second year benefits from a methyl bromide fumigation a year earlier, but there is quantitative data only on the first crop, then the data on the alternatives should cover only the first crop, and the benefits of methyl bromide and the additional pesticides that would have to be used on the rotational crop should be discussed in the comments sections.
Crop cycle change example:	If in a one year interval, methyl bromide is applied, tomatoes are grown and harvested followed by peppers, then the fumigation cycle would be one year including the tomatoes and peppers. If, however, without methyl bromide, it is not possible to follow tomatoes with peppers in the same one year interval, then the alternative data on pesticides, costs, yields, and revenues should just cover tomatoes. The loss of profit from not being able to grow peppers with the alternatives would be part of the loss from not having methyl bromide.
Crop Grouping	The applicant can group simliar crops together if: (i)Crops would experience similar yield and quality losses in the absence of methyl bromide; and (ii)Crops are grown on the same fumigation and cultivation cycle with similar operating costs. For example, nursery crops including various flower or tree species can be aggregated, with average yields per acre and prices. However, if crops are distinctly different in revenues and operating costs, or the cycles, the applicant may want to present yield, price and operating costs for each crop separately and also indicate the proportion of land area allocated to each crop.


USDA Plant Hardiness Zone Map
Average Annual
Minimum Temperature
Temperature (F)
Zone
Below -50
1
-45 to -50
2a
-40 to -45
2b
-35 to -40
3a
-30 to -35
3b
-25 to -30
4a
-20 to -25
4b
-15 to -20
5a
-10 to -15
5b
-5 to -10
6a
0 to -5
6b
5 to 0
7a
10 to 5
7b
15 to 10
8a
20 to 15
8b
25 to 20
9a
30 to 25
9b
35 to 30
10a
40 to 35
10b
40 +
11